

SUBJECT USSR/MATHEMATICS/Theory of functions CARD 1/3 PG -453  
 AUTHOR GERONIMUS Ja.L.  
 TITLE On some properties of analytic functions being continuous in  
 the closed circle or sector of a circle.  
 PERIODICAL Mat.Sbornik, n. Ser. 38, 319-330 (1956)  
 reviewed 12/1956

The paper contains some generalizations of known results of Hardy, Littlewood, Gagua and others. Let  $\varphi(z) = \varphi(r e^{i\theta})$  be continuous for  $r \leq 1$ . Let its modul of continuity for  $r = 1$  be  $\omega(\delta, \varphi) = \sup |\varphi(e^{i\theta_1}) - \varphi(e^{i\theta_2})|$ ,  $|\theta_1 - \theta_2| \leq \delta$ .

Let  $\Lambda$  be the function class for which  $\int_a^b \frac{\omega(x, \varphi)}{x} dx < \infty$ . If  $u(\theta) \in L(0, 2\pi)$

is a real  $2\pi$ -periodic function and  $v(\theta)$  is conjugated to it, then  $f(z)$  denotes the analytic function

$$f(z) = f(r e^{i\varphi}) = \frac{1}{2\pi} \int_0^{2\pi} \frac{e^{i\theta} + z}{e^{i\theta} - z} u(\theta) d\theta + iC,$$

The following theorems are proved:

Mat.Sbornik, n. Ser. 38, 319-330 (1956)

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1. Let  $w = f(z)$  map the unit circle onto a region  $B$  which is bounded by a closed smooth Jordan curve  $C$ . Let  $\theta(s) \in \Delta$ , where  $\theta$  is the angle between the real axis and the tangent on  $C$  in the point with the arc coordinate  $s$ . Then the modul of continuity  $\omega_0(\delta)$  of the functions  $f'(z)$  and  $f''(z)$  on  $|z| = 1$  satisfies the inequation

$$\omega_0(\delta) \leq c_1 \int_0^\delta \frac{\omega(x, \theta)}{x} dx + c_2 \delta \int_0^\pi \frac{\omega(x, \theta)}{x^2} dx + c_3 \omega(\delta, \theta).$$

2. Let  $f(z)$  be regular in  $|z| < 1$ , continuous in  $|z| \leq 1$  and have a modul of continuity  $\omega(\delta) = \omega(\delta, f)$  on  $|z| = 1$ . Then in  $|z| < 1$  holds

$$|f'(r e^{i\varphi})| \leq c \frac{\omega[(1-r) \lg \frac{b}{1-r}]}{1-r}, \quad r < 1, \quad b > 1.$$

3. If  $f(z)$  is regular in  $|z| < 1$  and if it has the modul of continuity  $\omega(\delta)$  on the circular radii, then

Mat. Sbornik, n. Ser. 30, 319-330 (1956)

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$$|f'(r e^{i\theta})| \leq c \Omega\left(\frac{1}{1-r}\right) \quad \Omega(x) = \int_1^x \omega\left(\frac{1}{x}\right) dx$$

4. If  $u(\theta) \in L(0, 2\pi)$  is a real  $2\pi$ -periodic function which is continuous for  $\theta \in 1 \subset [0, 2\pi]$  and if there exists the integral

$$\int_0^a \frac{\omega(x \lg \frac{b}{x}; u)}{x} dx < \infty \quad b > 2,$$

then inside of the sector  $S$  ( $r \leq 1$ ,  $\theta \in 1$ ) the inequation

$$|f'(r e^{i\theta})| \leq c \frac{\omega\left[(1-r) \lg \frac{b}{1-r}; u\right]}{1-r}, \quad r < 1$$

is valid.

INSTITUTION: Charkov.

CONTINUATION

SUBJECT USSR/MATHEMATICS/Fourier series  
 AUTHOR GERONIMUS Ya.L.  
 TITLE On some sufficient conditions for the convergence of the Fourier-CebySev processes.  
 PERIODICAL Doklady Akad.Nauk 110, 907-909 (1956)  
 reviewed 3/1957

Let the function  $f(x)$  be defined on  $[-1, +1]$  and the polynomials  $\{p_n(x)\}_0^\infty$  on the same interval be orthogonal with respect to  $d\psi(x)$  and normalized. In a table the author establishes nine sufficient conditions for the convergence of the Fourier-CebySev process

$$\lim_{n \rightarrow \infty} S_n(f; x) = \sum_{k=0}^{\infty} a_k p_k(x) = f(x), \quad a_k = \int_{-1}^{+1} f(x) p_k(x) d\psi(x) \quad k=0, 1, \dots$$

The first condition relates to the quasi-uniform convergence on  $[a, b]$  ( $-1 < a < b < +1$ ) all other conditions guarantee a uniform convergence on  $[-1, +1]$ . The conditions are concluded from the estimations of the author (Doklady Akad.Nauk 103, No. 3 (1955)).

SOV/44-58-4-3038

Translation from: Referativnyy zhurnal, Matematika, 1958,  
Nr 4, p 89 (USSR)

AUTHOR: Geronimus, Ya. L.

TITLE: On Certain Finite Difference Equations and Corresponding  
Systems of Orthogonal Polynomials (O nekotorykh  
uravneniyakh v konechnykh raznostyakh i sootvetstvuyushchikh  
sistemakh ortogonal'nykh mnogochlenov)

PERIODICAL: Uch. zap. Khar'khovsk. un-ta, 1957, Nr 80; Zap. Matem.  
otd. fiz-matem. fak. i Khar'khovsk. matem. o-va, 25,  
pp 87-100

ABSTRACT: With several additions, a detailed proof is given of  
earlier results of the author (Dokl. AN SSSR, 1940, Nr 29,  
pp 536-538).

Let  $\{a_k\}$  and  $\{\lambda_k\}$  ( $\lambda_k \neq 0$ ) be two sequences of complex numbers.  
Following Perron and Stieltjes, according to the given num-  
bers a sequence of polynomials  $\{P_k^{(i)}(z)\}$  is constructed, where-  
upon the polynomials

$P_n^{(1)}(z)$  and  $\lambda_1 P_{n-1}^{(2)}(z)$

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SOV/44-58-4-3038

On Certain Finite Difference Equations (Cont.)

are particular solutions of the difference equations

$$y_n - (z - \alpha_n) y_{n-1} + \lambda_n y_{n-2} = 0 \quad (1)$$

If periodicity occurs, that is  $\alpha_n = \alpha_m, \lambda_n = \lambda_m, n-s \equiv m \pmod{k}; (m=0, 1, \dots, k), n \geq s+1, s \geq 0$  (2)

then the solution of equation (1) satisfies an equation with constant coefficients

$$y_{n+2k} - (P_k - r_{k-2}) y_{n+k} + l y_n = 0, n \geq s-1 \quad (3)$$

Here  $P_k$  and  $r_{k-2}$  are certain polynomials with respect to  $z$  and  $l = l_1 l_2 \dots l_k$ .

The solution of equation (3) is found in explicit form; certain of its properties and properties of the polynomial of the form  $P_k(l)(z)$  are indicated.

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SOV/44-58-4-3038

## On Certain Finite Difference Equations (Cont.)

If all the parameters  $\{\alpha_y\}$  and  $\{\lambda_y\}$  ( $\lambda_y > 0$ ) are real, then as is known, the corresponding polynomials  $\{P_y(x)\}$  are orthogonal in the sense that there exists such a  $\psi(x)$  that  $\int_{-\infty}^{+\infty} P_m(x) P_n(x) d\psi(x) = 0$ ,  $m \neq n$ , and they satisfy equation (1). It is shown that when the condition (2) is satisfied,  $\psi(x) = \psi_1(x) + \psi_2(x)$ . Function  $\psi_1(x)$  is an absolutely continuous component, and  $\psi_2(x)$  is a jump function. Certain properties of  $\psi(x)$  and  $\psi_1(x)$  are established. The proof is based on the study of continuous fractions. In conclusion some examples are cited. In the work of the author (Izv. AN SSSR, 1941, 5, Nr 3, pp 203-210) a more general case of limit periodicity is studied.

A. A. Mirolyubov

Card 3/3

SOW/124-59-1-43

Translation from: Referativnyy zhurnal. Mekhanika, 1959, Nr 1, p 4 (USSR)

AUTHOR: Geronimus, Ya.L.

TITLE: On the Properties of the Hamilton-center of Certain Vector Systems

PERIODICAL: Tr. Khar'kovsk. aviats. in-ta, 1957, Nr 17, pp 11-21

ABSTRACT: Some new facts with reference to the properties of the Hamilton-center in application to certain special systems of stationary physical vectors are given. For example, in application to a vector-system, lying in planes perpendicular to some straight line, is proved the invariance of the Hamilton-center and of the parameter of the screw of the given system relative to the group of rotations of vectors in their planes; demonstration is based upon the application of the quaternion-theory. Some results of the treatise can be applied, for example, to the research of the properties of the Hamilton system of vectors  $m(d^n\mathbf{r}/dt^n)$  with reference to the rotation of a body around an axis and with reference to the plane-parallel motion; the part of the Hamilton-center in applying the forces of inertia of the points of a symmetrical gyroscope in the case of regular precession is interpreted, et a.

Card 1/1

V.V. Dobronravov

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GERONIMUS, Ye.L., prof., doktor fiz.-mat. nauk.

Activity of the Kharkov branch of the Seminar on the Theory of  
Machines and Mechanisms. Trudy Inst. mash. Sem. po teor. mash.  
17 no.65:18-19 '57. (MIRA 10:12)

1. Nauchnyy rukovoditel' Khar'kovskogo filiala seminara po teorii  
mashin i mekhanizmov Instituta mashinovedeniya AN SSSR.  
(Kharkov--Mechanical engineering)

GERONIMUS, Ya. L. (Khar'kov)

Certain finite-difference equations and corresponding systems  
of orthogonal polynomials. Uch.zap.KHGU 80:87-100 '57.

(MIRA 12:11)

(Difference equations) (Polynomials)

AUTHOR GERONIMUS, IAI. PA - 3122  
TITLE On the Uniform Convergence of the FOURIER-CHEBYSHEV and the  
MACLAURIN Developments of the Analytical Functions of the Class  
 $H_2$   
PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 113, Nr 3, pp 491-492 (USSR).  
Received: 6/1957 Reviewed: 7/1957  
ABSTRACT The polynomials  $\{P_n(z)\}$  are assumed to be orthonormal in the  
unit surrounding  $z = e^{i\theta}$  with respect to the weight  $p(\theta) \geq 0$  where  
 $\int p(\theta) d\theta \in L_1$  applies. The function  $f(z)$  is assumed to be regular  
within the domain  $|z| < 1$ , where  $f(z) \in H_2$  and  $f(z)/\pi(z) \in H_2$   
apply. Here

$$\pi(z) = \exp \left\{ -\frac{1}{4\pi} \int_0^{2\pi} \frac{e^{i\theta} + z}{e^{i\theta} - z} \ell_{sp}(\theta) d\theta \right\}, \quad |z| < 1$$

is denoted by  $s_n(f; z)$ .  $\sigma_n(f; z)$  are the partial sums of the  
developments of the function  $f(z)$  into a FOURIER-CHEBYSHEV-series  
according to the orthogonal polynomials  $\{P_k(z)\}$  and into a

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On the Uniform Convergence of the FOURIER-CHEBYSHEV and the  
 MACLAURIN Developments of the Analytical Functions of the Class  
 $H_2$ .

MAC LAURIN series, i.e. according the polynomials  $\{z^k\}$ :

$$s_n(f; z) = \sum_{k=0}^n c_k p_k(z), \quad c_k = (1/2\pi) \int_0^{2\pi} f(e^{i\theta}) p_k(e^{i\theta}) p(\theta) d\theta$$

$$\sigma_n(f; z) = \sum_{k=0}^n \gamma_k z^k, \quad \gamma_k = (1/2\pi) \int_0^{2\pi} f(e^{i\theta}) e^{-ik\theta} d\theta$$

Of all theorems on the convergence of the FOURIER-CHEBYSHEV-  
 developments the theorem on the uniform convergence of these  
 decompositions is the most interesting. Here the condition is  
 concerned, for which the limiting relation  $\lim$

CARD 2/4  $\lim_{n \rightarrow \infty} \{s_n(f; e^{i\theta}) - \sigma_n(f; e^{i\theta})\}$  applies uniformly within a certain

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On the Uniform Convergence of the FOURIER-CHEBYSHEV and the  
MACLAURIN Developments of the Analytical Functions of the Class  
 $H_2$ .

section  $[a, \beta] \circ [0, 2\pi]$

Theorem: The weight  $p(\theta)$  is assumed to be limited in the section  
 $[a, \beta]$  by a positive number and to be steady with the stability  
modulus  $\omega(\delta; p)$ .

This stability modulus satisfies the condition by DINI-LIPP-SCHITZ

$$\omega(\delta; p) < c(\lg(1/\delta))^{-\gamma}, \gamma > 2$$

The function  $f(z)$  is assumed to have a limited radial limit value  
in all points of the arc.  $[e^{ia}, e^{i\beta}]$ .

In this case the condition  $\lim_{n \rightarrow \infty} \{\epsilon_n \lg n\} = 0$  with

$$|P_n^*(e^{i\theta}) - \pi(e^{i\theta})| \leq \epsilon_n, P_n^*(z) = z^n P_n(1/z), a + \eta \leq \theta \leq \beta - \eta$$

is sufficient for the uniform convergence of  $\lim_{n \rightarrow \infty} \{s_n(f; e^{i\theta}) - \sigma_n(f; e^{i\theta})\}$

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On the Uniform Convergence of the FOURIER-CHEBYSHEV and the  
MACLAURIN Development of the Analytical Functions of the Class  
 $H_2$ .

= 0 in the section  $[\alpha + \eta', \beta - \eta']$ ,  $\eta' > \eta$ .  
Thus, the existence of the asymptotic formula with the error  
 $\mathcal{E}_n = O(1/\lg n)$  satisfied the conditions of uniform convergence.  
A table contains the 5 conditions found here, each of which  
suffices for the existence of the here mentioned asymptotic  
formula.  
(1 Table).

ASSOCIATION: not given.

PRESENTED BY: V.I. SMIRNOV, Member of the Academy, 6.10. 1956.

SUBMITTED: 4.10. 1956.

AVAILABLE: Library of Congress.

CARD 4/4

AUTHOR: GERONIMUS, Ya., L..

20-1-5/42

TITLE: On Some Estimations in the Theory of Toeplitz Forms and Orthogonal Polynomials (O nekotorykh otsenkakh v teorii form Teplitsa i ortogonal'nykh mnogochlenov)

PERIODICAL: Doklady Akad. Nauk SSSR, 1957, Vol. 117, Nr. 1, pp. 25-27 (USSR)

ABSTRACT: The author considers the forms

$$T_n = \sum_{i,k=0}^n c_{i-k} x_i \bar{x}_k, \quad c_{-n} = \bar{c}_n, \quad \Delta_n = |c_{i-k}|_0^n, \quad n=0, 1, 2, \dots,$$

positive definite for  $\{\Delta_n\}_0^\infty > 0$ . If it is denoted

$$h_n = \frac{\Delta_{n+1}}{\Delta_n}, \text{ then there exists } \lim_{n \rightarrow \infty} h_n = h > 0.$$

The author gives several estimations for the magnitude

$\mu_n = h_n - h$  and shows that various estimations can be ex-

pressed by  $\mu_n$ , e.g. the estimation of increase of orthogonal polynomials.<sup>2</sup> 5 Soviet and 2 foreign references are quoted.

ASSOCIATION: Khar'kov Institute of Aviation (Khar'kovskiy aviationsionnyy institut)

PRESENTED: By V.I. Smirnov, Academician, May 23, 1957

SUBMITTED: May 21, 1957

AVAILABLE: Library of Congress

Card 1/1

SECRET//REL TO USA

Ya. L. Geronimus, "The Application of the Tschebischew Methods in Some Problems of Dynamic Mechanism Synthesis."

paper presented at the 2nd All-Union Conf. on Fundamental Problems in the Theory of Machines and Mechanisms, Moscow, USSR, 24-28 March 1958.

16(1); 25(2) PHASE I BOOK EXPLOITATION SOV/1741

Geronimus, Yakov Lazarevich

Dinamicheskiy sintez mekhanizmov po metodu Chebysheva (Dynamic  
Synthesis of Mechanisms According to Chebyshev Method) Khar'kov,  
Izd-vo Khar'kovskogo univ., 1958. 133 p. 3,000 copies printed.

Resp. Ed.: Yu.V. Epshteyn; Ed.: D.A. Vaynberg; Tech. Ed.:  
Ya.T. Chernyshenko.

PURPOSE: This book is intended for senior students at vtuzes and  
for engineers and mathematicians.

COVERAGE: The book deals with the problem of the dynamic synthesis  
of mechanisms according to Chebyshev's method and the develop-  
ment and application of this method by Soviet mathematicians.  
Methods studied and results received in the book may have direct  
application to practical problems. The book is an extension of  
the author's report on the theory of machines and mechanisms  
presented at the meeting of the Institut mashinovedeniya (Institute

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Dynamic Synthesis of Mechanisms (Cont.) SOV/1741

of Mechanical Engineering) of the Academy of Sciences, USSR, held on the occasion of the 130th anniversary of Chebyshev's birth. Contemporary Soviet scientists mentioned in connection with the problem presented in the book include Academician V.A. Steklov, Academician I.I. Artobolevskiy, N.I. Levitskiy, Z.Sh. Blokh, V.I. Ivanov, P.N. Gartshtain, Yu. V. Epshtein, L.I. Shteyuvol'f, and L.B. Geyler. There are 53 references, of which 52 are Soviet and 1 French.

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6-22-59

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PHASE I BOOK EXPLOITATION

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Geronimus, Yakov Lazarevich

Mnogochleny, ortogonal'nyye na okruglosti i na otrezke; otsenki, asimptoticheskiye formuly, ortogonal'nyye ryady (Polynomials Which Are Orthogonal on a Circle and on a Segment; Estimates, Asymptotic Formulas, Orthogonal Series) Moscow, Fizmatgiz, 1958. 240 p. (Series: Sovremenyye problemy matematiki) 5,000 copies printed.

Ed.: V. S. Videnskiy; Tech. Ed.: V. N. Kryuchkova.

PURPOSE: This book may be useful to scientific workers and Aspirants working in mathematics or mathematical physics.

COVERAGE: The book presents the author's attempt to develop and to apply the methods and ideas of Soviet mathematicians V. A. Steklov, S. N. Bernshtein, V. I. Smirnov, A. N. Kolmogorov, N. I. Akhiyezer, M. G. Kreyn and of such

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Polynomials Which Are Orthogonal (Cont.)

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non-Soviet mathematicians as G. Szegö, P. Erdős, P. Turan and G. Freud to the solution of important problems of the theory of orthogonal polynomials. The author deals with those properties of orthogonal polynomials, on which the convergence of infinite processes connected with orthogonal polynomials depends - the Fourier-Chebyshev process, the interpolation process with nodes in zeros of orthogonal polynomials, etc. The monograph gives a systematic presentation of the works of Soviet and non-Soviet mathematicians, including the author, in this field of mathematics. The book is one of a series published by the editorial staff of Uspekhi matematicheskikh nauk. The author thanks N. I. Akhiyezer for reading the manuscript and for valuable remarks. There are 67 references, of which 36 are Soviet, 14 English, 10 German, 6 French and 1 Czech.

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Remarks

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6-6-59

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AUTHOR: Geronimus, Ya.L. (Kharkov) SOV/140-56-1-3/21  
TITLE: On Some Properties of the Functions of the Class  $L_p$  (O nekotorykh svoystvakh funktsiy klassa  $L_p$ )  
PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy Ministerstva vysshego obrazovaniya SSSR, Matematika, 1958, Nr 1 pp 24-32 (USSR)  
ABSTRACT: Let  $f(\theta)$  be a real  $2\pi$ -periodic function of the class  $L_p$ ,  $p > 1$  and  $\omega_p(\delta, f) = \sup_{|h| \leq \delta} \|f(\theta + h) - f(\theta)\|_p$ ,  $\lim_{\delta \rightarrow 0} \omega_p(\delta, f) = 0$ .

The author proves the theorem already announced in [Ref 2] and the following further theorems:

Theorem: Let

$$f(\theta) \in L_p, p > 1, \sum_{n=1}^{\infty} n^{-1/p} \omega_p\left(\frac{1}{n}; f\right) < \infty, \frac{1}{p} + \frac{1}{p'} = 1$$

Then  $f(\theta)$  is equivalent to a continuous function  $f_0(\theta)$  with the modulus of continuity

$$\omega(\delta, f_0) \leq c \int_{1/\delta}^{\infty} \frac{dx}{x} \int_x^{\infty} y^{-1/p} \omega_p\left(\frac{1}{y}; f\right) dy$$

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On Some Properties of the Functions of the Class  $L_p$  307/140-58-1-3/21

(so far as the double integral exists).

Theorem: If  $f(\theta) \in L_p$ ,  $p > 1$  and  $\omega_p(\delta, f) = 0 \left\{ \delta^{1/p} \left[ \lg \frac{1}{\delta} \right]^{-3} \right\}$ ,

then the Fourier series of  $f(\theta)$  converges uniformly on  $[0, 2\pi]$  and attains almost everywhere the values of  $f(\theta)$ .

Theorem: Let  $f(\theta) \in L_1(0, 2\pi)$ , on  $[\alpha, \beta] \subset [0, 2\pi]$  let

$f(\theta) \in L_p$ ,  $p > 1$  and

$$\omega_p'(\delta; f) = \sup_{|h| \leq \delta} \left\{ \frac{1}{2\pi} \int_{\alpha}^{\beta} |f(\theta + h) - f(\theta)|^p d\theta \right\}^{1/p} = 0 \left\{ \delta^{1/p} \left[ \lg \frac{1}{\delta} \right]^{-3} \right\}$$

Then the Fourier series of  $f(\theta)$  converges uniformly in  $[\alpha, \beta]$  and attains almost everywhere the values of  $f(\theta)$ .

Some further results related to the results of Hardy and Littlewood are given.

There are 12 references, 5 of which are Soviet, 1 Polish, 1 English, 1 French, 1 Hungarian, 1 American, and 2 German.

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On Some Properties of the Functions of the Class  $L_p$  SOV/140-58-1-3/21

ASSOCIATION: khar'kovskiy aviatsionnyy institut (Kharkov Aviation Institute)

SUBMITTED: September 23, 1957

Card 3/3

GERONIMUS, Ya.L.

Some evaluations for orthogonal polynomials. Nauch. dokl. vys.  
skoly; fiz.-mat.nauki no.1:28-31 '58. (MIRA 12:3)

1. Khar'kovskiy aviationsionnyy institut.  
(Functions, Orthogonal)

E031/E413  
3/14739/000/04/020/020

TITLE :  
The Scientific-Technical Conference at Vbarnom  
Soturkhan, V.K.

PERIODICAL: Investitsiya v yashchikh uchebnykh zadaniiakh. Aviatsionnyi in-t im. S. P. Koroleva

Соколова, А. А. Учебник по аэродинамике. - М.: ГИИА, 1959. - 400 с. - (Серия: Учебники по гражданской авиации: Авиационные науки).

**ABSTRACT:** In May 1959, the 16th Conference of Professional and

are read: "A Spectral Representation of the Theory of Axisymmetric Turbulence" by Cendanis of the Institute of Mathematics and Mathematical Sciences of M. Ternovskii; "Some Evaluations for Functions with Positive Real Parts" by Assistant G. S. Smak;

Corrections. Methods for Mixed Systems of Functional Equations. Thesis for Doctores. Candidate of Physical and Mathematical Sciences. M. N. Tikhonov. "On the Application of Bohl and Chebyshev Points to the Solution of Some Problems in the Synthesis of Four-Bar Linkages." Thesis. Candidate of Physical and Mathematical Sciences. T. I. Geronim. "The Influence of

**Properties of Functions on the Convergence Almost Everywhere of their Cesàro-Jordan Fourier Series** By D. L. Orlinskii. General Technological Lecture.

1. "The Problem of Determining the Exact  
Transverse Co-ordinates of the Head  
of a Phoenixite," by Senior Instructor  
Investigating "An Electro-Graphical Method of  
Traversing the Structure of Matter" by Anatolians  
2. "The Results of the Vitt  
Surveys," by Senior Instructor

Seventy-eighth Congress of Chemists of the USSR by Docent, Candidate of Chemical Sciences f.i.mech., Electrical and Radio-Technology Section, Institute of Machine Papers were read: "On the Problem of the Passage of Transients in an Electrodynamic Oscillator

Controlling Factors in an Electric Drive with a  
Science Major Parallel to the Candidate of Technical  
or the Reactants in Synchronous Generators. Instructor: S. G. Romanovskii. "An Experimental Method  
of Investigating Electrical Apparatus." In

4/11 A. L. Linton "A Discrete Transformer of Currents into Direct Signals with Magneto-Electric Comparison. Checked by the Application of Infrared Instruments in Aviation" by Docent. Candidate of Technical Sciences L. L. Linton

General Engineering Section, M.V.A.C. 1941  
Graduate of Mechanical Sciences L.I.T. 1940  
The Addition of a Thermobalastic Chamber to the  
Simulation of a Thermobalastic Chamber to the  
and Certain Results of a Mine Staff in Mechanical  
Mechanical Chamber of Investigations to Determine

Practical Characteristic of Some Different  
Temperatures and Humidities of Sand. Candidate of  
Technical Sciences Mal'kovich, Candidate of  
Abrasives in Ceramics by Doctor, Candidate of  
Sciences O. I. Gladkaya. Candidate of Technical  
Sciences O. I. Gladkaya. The Candidate of Technical  
Sciences O. I. Gladkaya.

Associate Professor of Chemistry of the University of Michigan,  
The Influence of Various Agents on the Elasticity of  
Welded Connections by Assistant Professor of  
Investigation of Cerments *Glidite* *Boatite* *by Assistant  
A. J. Morphew.*

APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514910016-4"

24.4/00

S/044/62/000/009/004/069  
A060/A000AUTHOR: Geronimus, Ya. L.

TITLE: On some methods of constructing Burmester curves and points. I.

PERIODICAL: Referativnyy zhurnal, Matematika, no. 9, 1962, 65, abstract 9A366  
("Bul. Inst. politehn. Iasi.", 1959, V, (IX), no. 3 - 4, 234 - 254  
(Summaries in English, Rumanian))

TEXT: In the theory of mechanisms, Burmester's curves are the curves of circular points and the curve of centers. The former is characterized by the equation  $(x^2 + y^2)(mx + ly) - lm xy = 0$ , and the latter by a similar equation, but with the parameter  $l$  replaced by  $l'$ , defined by the equality:  $l/l - l/l' = 1/d$ , where  $d$  is the diameter of the winding curve. The double point of each of these curves coincides with the instantaneous center of velocities. Here the first part considers the transformation of Burmester's curves into a straight line, an equilateral hyperbola, a circle, and a parabola, using projective methods. Geometrical methods of constructing Burmester's curves are given: 1) given the coordinate axes and two points, 2) given two points, the focal axis and a

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Card 1/2

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AUTHOR: Geronimus, Ya. L.

SOV/20-129-4-3/68

TITLE: On the Order of Approximation by Means of Poisson's Integral,  
PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 726-729 (USSR)ABSTRACT: Let  $f(\theta) \in L(0, 2\pi)$  be a complex-valued,  $2\pi$ -periodic function of the real argument  $\theta$ ,  $0 \leq \theta \leq 2\pi$ . Let furthermore

$$(1) F(re^{i\varphi}) = \frac{1}{2\pi} \int_0^{2\pi} f(\theta) P(r, \theta - \varphi) d\theta, \quad P(r, t) = \frac{1-r^2}{1-2r \cos t + r^2}, \quad r < 1$$

and

$$(2) \Delta(r, \varphi) = F(re^{i\varphi}) - f(\varphi) = \frac{1}{2\pi} \int_0^{\pi} w_{\varphi}(t) P(r, t) dt, \quad r < 1,$$

where  $w_{\varphi}(t) = f(\varphi+t) + f(\varphi-t) - 2f(\varphi)$ .Let  $f(\theta)$  be continuous in  $\varphi$  or let it have there a discontinuity of first kind; let

$$(4) \quad f(\varphi) = \frac{1}{2} \{f(\varphi+0) + f(\varphi-0)\}$$

and

$$(5) \quad w_{\varphi}(\delta) = \sup_{|t| \leq \delta} |w_{\varphi}(t)|.$$

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Theorem 1: If for a  $\gamma$  ( $0 < \gamma \leq 1$ ) there exists the integral

On the Order of Approximation by Means of Poisson's Integral 6724  
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$$(6) \int_0^{\pi} |w_{\varphi}(t)| t^{-1-\delta} dt,$$

then for  $r_0 \leq r < 1$  there holds the inequation

$$(7) |\Delta(r, \varphi)| \leq C(1-r)^{\delta} \int_0^{\pi} |w_{\varphi}(t)| t^{-1-\delta} dt, \quad C = \frac{1}{\pi} \left( \frac{\pi^2}{4r_0} \right)^{\frac{1+\delta}{2}}.$$

Theorem 2: For  $r_0 \leq r < 1$  it holds

$$(8) |\Delta(r, \varphi)| \leq C_2 \frac{1-r}{\delta^2}, \quad C_2 = \frac{\pi}{4r_0} \left\{ \int_0^{2\pi} |f(t)| dt + 2\pi |f(\varphi)| \right\} + 1$$

where  $\delta$  is determined from

$$(10) 1-r^2 = \delta^2 w_{\varphi}(\delta).$$

Further 4 theorems contain estimations for  $|\Delta(r, \varphi)|$  in other cases, especially if the behavior of the function on a set  $E \subset [0, 2\pi]$  is known, e.g.:

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On the Order of Approximation by Means of Poisson's Integral Sov/20-129-4-3/68

Theorem 5: Let  $f(\theta)$  be continuous on  $[\alpha, \beta] \subset [0, 2\pi]$  and let it have there the modulus of continuity  $\omega(\delta)$ . Then for  $\alpha + \delta \leq \varphi, \psi \leq \beta - \delta, \delta > 0, r_0 \leq r < 1$  there holds the estimation

(15)  $|\Delta(r, \varphi)| \leq c_5(1-r) + \omega(|\varphi - \psi|) + c_6 \omega \left\{ (1-r) \lg \frac{1}{1-r} \right\},$

where the constants  $c_5$  and  $c_6$  do not depend on  $r, \varphi, \psi$ .

The author mentions I.P. Natanson. There are 2 Soviet references.

PRESENTED: July 16, 1959, by S.N. Bernshteyn, Academician.

SUBMITTED: June 25, 1959

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Card 3/3

GEORGE, J. A. L.

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JOURNAL OF COMMERCIAL

12.1.8

PURPOSE. This book is intended for scientific research workers and engineers concerned with the theory and design of mechanisms.

ARMY RECRUITING SERVICE ON THE STORY OF HONORABLE AND PROUDLY SERVED. 20c. No. 733 MAY 1942. 59 pp. Approx. 115 illustrations. 2,000 copies.

APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514910016-4"

244100  
S/044/62/C00/009/005/069  
AC60/A000

AUTHOR: Geronimus, Ya. L.

TITLE: On some methods of constructing Burmester curves and points. II.

PERIODICAL: Referativnyy zhurnal, Matematika, no. 9, 1962, 65, abstract 9A367  
("Bul. Inst. politehn. Iasi", 1960, v. 6, no. 3 - 4, 275 - 290  
(Summaries in English, Rumanian))

TEXT: In the author's preceding paper (abstract 9A366) the construction of one of Burmester's curves was given. The present paper considers the simultaneous construction of both curves. For a complete determination of these curves it is necessary to give four conditions for the general case. Attention is paid to the case when the conditions imposed separately upon each of the curves do not determine it, but the totality of the conditions imposed upon both curves determine the latter. For the motion of a moving plane along the fixed plane the points of the first Burmester's curve possess the property that their trajectories have at those points an osculation of an order not lower than the third with their circles of curvature; it is known that in a

Card 1/2  
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GERONIMUS, Ya. L.

Applying Ball and Chernyshev points to the solution of some problems  
in the synthesis of mechanisms. Trudy Inst.mash.Sem.po teor.mash.  
20 no.78:43-60 '60. (MIRA 17:3)  
(Mechanical movements)

16-3500

80206

AUTHOR: Geronimus, Ya.L.

5/038/60/024/02/04/007

TITLE: On Some Estimations for the Coefficients of Bounded Functions, 6PERIODICAL: Izvestiya Akademii nauk SSSR, Seriya matematicheskaya, 1960,  
Vol. 24, No. 2, pp. 203-212TEXT: Let  $S$  denote the class of the functions
$$f(z) = \sum_{k=0}^{\infty} \alpha_k z^k$$

which are regular in  $|z| < 1$  and satisfy the condition  $|f(z)| < 1$ .

Theorem 1: If  $f(z) \in S$  and  $\frac{3}{2} m < n \leq 2m$ , then it holds:

$$\mu, \mu^2 - \mu^3 = |\alpha_n|^2, |\alpha_n| \leq \infty = 14\sqrt{3} - 24$$

$$(II) |\alpha_n| \leq \left\{ \frac{4\sqrt{3}}{g} \left\{ 1 - \frac{9}{8} |\alpha_n| + (1 - \frac{3}{4} |\alpha_n|)^{3/2} \right\}^{1/2}, |\alpha_n| \geq \infty \right.$$

where  $\mu > \frac{2}{3}$  is the root of  $\mu^2 - \mu^3 = |\alpha_n|^2$ . The equality sign only holds  $\checkmark$

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On Some Inequalities for the Coefficients  
of Bounded Functions

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3/038/60/024/02/04/007

$$f^*(z) = \begin{cases} z^{2m-n} \frac{\sqrt{1-\mu} + z^{n-m}}{z^{n-m} \sqrt{1-\mu} + 1} & , \quad |\alpha_n| \leq \alpha \\ z^{2m-n} \frac{8\lambda^2 z^{2(n-m)} + 4\lambda z^{n-m} - 1}{8\lambda^2 + 4\lambda z^{n-m} - z^{2(n-m)}} & , \quad \lambda = \sqrt{\frac{14 - 14\alpha_n - 1}{8(1 - |\alpha_n|)}} , |\alpha_n| > \alpha \end{cases}$$

Theorem 2 is the special case for  $m = 1, n = 2$ .

Theorem 3 : Let  $f(z) \in S$ . 1.) If  $m$  is the smallest value of the index  $n$  for which the inequality  $|\alpha_n| \leq \frac{\sqrt{5} - 1}{2}$  does not hold, then this inequality can be wrong only for the values  $m \leq n \leq 2m$ . 2.) If  $m$  is the smallest value of  $n$  for which  $|\alpha_n| \leq \frac{14\sqrt{7} - 20}{27}$  does not hold, then this inequality can

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On Some Estimations for the Coefficients  
of Bounded Functions

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be wrong only for the values  $m \leq n \leq \frac{3}{2} m$ .

Theorem 4 is already partially contained in (Ref. 3) by G.M. Goluzin.  
There are 7 references : 3 Soviet, 3 Hungarian and 1 American.

PRESENTED: by S.N. Bernshteyn, Academician

SUBMITTED: January 31, 1959

X

Card 3/3

GERONIMUS, Ya.I.

Finding Burmester points in case of a splitting of both Burmester curves. Trudy Inst. mash. i mekhanichesk. 22 no.85/86:5-13 '61.  
(MIR 14:12)  
(Geometry, Analytic) (Mechanical movements)

GERONIMUS, Ya.L.

Some fundamental inequalities in the theory of orthogonal polynomials. Dokl. AN SSSR 140 no.5:1002-1004 C '61.

l. Khar'kovskiy aviationsionnyy institut. Predstavлено akademikom S.N.Bernshteynom.

(Inequalities(Mathematics))  
(Functions, Orthogonal)

GERONIMUS, Ya.I.

Use of orthogonal polynomials in studying certain boundary  
properties of functions. Uch.zap. KGU 115:97-112 '61.  
(MIRA 17:5)

GERONIMUS, Yakov Lazarevich; SPERANSKIY, N.V., red.; MURASHOVA, N.Ya.,  
tekhn. red.

[Geometrical apparatus of the theory of synthesis of plane  
mechanisms] Geometricheskiy apparat teorii sinteza ploskikh me-  
khanizmov. Moskva, Fizmatgiz, 1962. 399 p. (MIRA 15:11)  
(Geometry, Modern) (Mechanics, Analytic)

9,3140

31942  
S/057/62/032/001/001/018  
B146/B112

AUTHOR: Geronimus, Ya. L.

TITLE: Methods of producing fields with focusing properties

PERIODICAL: Zhurnal tehnicheskoy fiziki, v. 52, no. 1, 1962, 3-14

TEXT: The author studied the motion of charged particles in a steady electromagnetic field; he describes methods of finding focusing fields in some special cases. The interaction between particles is neglected, and particle motion is considered in two-dimensional approximation. The Hamilton-Jacobian differential equation referred to orthogonal, curvilinear, isothermal coordinates  $q_1, q_2$  ( $ds^2 = c^2(dq_1^2 + dq_2^2)$ )

$$\left( \frac{\partial W}{\partial q_1} - \frac{e_0 \sigma A_1}{c} \right)^2 + \left( \frac{\partial W}{\partial q_2} - \frac{e_0 \sigma A_2}{c} \right)^2 = v^2, \quad (1.3)$$

$$v^2 = v^2(q_1, q_2) = 2m_0 c^2 \left\{ h - e_0 \varphi + \frac{1}{2m_0 c^2} (h - e_0 \varphi)^2 \right\}, \quad (1.4)$$

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Methods of producing fields with ...

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( $m_0$  - mass at rest,  $h$  - total energy,  $e_0$  - charge,  $v$  - particle velocity,  $A_1, A_2$  - vector potential components) is integrated for the special case of a cyclic coordinate. One obtains the particle orbits, the focusing condition and, finally, the required electromagnetic field. It is shown that the integration variable in the focusing condition cannot be monotonically growing; cases are considered where it has one or two extreme values. The absence of the electric field and the case of constant  $v^2$  for the variable with one extreme value, the case  $v^2 = \text{const.}$ , and  $v = su$  ( $0 < 1$ ,  $u$  - function of the coordinate) for the variable with two maxima are specially dealt with. A paper by P. F. Pavinskii (Ref. 2: Izv. Ak. SSSR, ser. fizich., 18, no. 2, 175, 1954) is mentioned. There are 4 figures and 7 references: 5 Soviet and 2 non-Soviet.

ASSOCIATION: Khar'kovskiy aviatsionnyy institut (Khar'kov Aviation Institute)

SUBMITTED: November 25, 1960

Card 2/

S/057/62/032/007/008/013  
B104/B102

AUT<sup>OR</sup>: Geronimus, Ya. L.

TITLE: Focusing fields

PERIODICAL: Zhurnal tekhnicheskoy fiziki, v. 32, no. 7, 1962, 848-858

TEXT: The motion of a material point in a focusing potential field is investigated. The Hamilton-Jakobi equation in curvilinear orthogonal coordinates  $q_1$  and  $q_2$  reads:

$$\frac{1}{2m} \left\{ \frac{1}{h_1^2} \left( \frac{\partial W}{\partial q_1} \right)^2 + \frac{1}{h_2^2} \left( \frac{\partial W}{\partial q_2} \right)^2 \right\} + V = h, \quad V = V(q_1, q_2). \quad (1.2).$$

To solve the equation, the coordinates are assumed to be isothermal:  $h_1 = h_2 = \sigma(q_1, q_2)$ ; further, it is assumed that

$\sigma^2(q_1, q_2) = a_1(q_1) + a_2(q_2)$ , where  $a_1$  and  $a_2$  are known functions. For the potential, it is assumed:  $V = [b_1(q_1) + b_2(q_2)]/[a_1(q_1) + a_2(q_2)]$ ,

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Focusing fields

S/057/62/032/007/008/013  
B104/B102

where  $b_1(q_1)$  and  $b_2(q_2)$  are the desired functions. On these assumptions, a total integral of (1.2) is obtained with the aid of Liouville's theorem. The condition for focusing is derived from the condition for the trajectories:

$$\int_{q_{10}}^{q_1} \frac{dq_1}{\sqrt{2mha_1(q_1) - b_1(q_1) + \gamma}} = \int_{q_{20}}^{q_2} \frac{dq_2}{\sqrt{2mha_2(q_2) - b_2(q_2) + \gamma}},$$

wherein  $q_1$  and  $q_2$  are the end points,  $q_{10}$  and  $q_{20}$  are the starting points of the trajectories,  $\gamma_1 \leq \gamma \leq \gamma_2$  holds for the arbitrary constant  $\gamma$ .

The focusing problem is solved for one and for two extreme values of  $q_2$ . Finally, a geometrical solution method according to Euler-Maupert is examined. There are 4 figures.

ASSOCIATION: Khar'kovskiy aviationsionnyy institut (Khar'kov Aviation Institute)

SUBMITTED: August 12, 1961

Card 2/2

GERONIMUS, Ya. L.

Comments on V. A. Steklen's assumption. Dokl. akad. Nauk SSSR 192 no.3:  
507-509 Ja '62. (MIRA 15:1)

lv. khar'kovskiy aviationsionnyy institut. Predstavлено akademikom  
S.N.Bernshteynom.

(Polynomials)

GERONIMUS, Ya.L.

Relation between the order of growth of orthonormal polynomials  
and the nature of distribution. Dokl. AN SSSR 146 no.2:281-283  
(MIRA 15:9)  
S '62.

1. Khar'kovskiy aviatcionnyy institut. Predstavлено akademikom  
S.N. Bernshteynom.  
(Polynomials)

GERONIMUS, Ya.L.

Convergence of the Lagrange interpolation process with the  
points of interpolation in the roots of orthogonal poly-  
nomials. Izv. AN SSSR Ser. mat. 27 no.3:529-560 My-Je '63.  
(MIRA 16:6)

(Functions, Orthogonal)  
(Interpolation)

"APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514910016-4

GERONIMUS, Ya.L.

V.A. Steklov's assumption. Uch, zap, KRGU 135:79-88 '64.  
(MIRA 17:10)

APPROVED FOR RELEASE: 09/24/2001

CIA-RDP86-00513R000514910016-4"

GERONIMUS, Ya. L. (Khar'kov)

Mean weighted and uniform approximations of functions on rectifiable curves. Ukr. mat. zhur. 17 no.3:18-31 '65.  
(MIR 18:6)

GERONIMUS, Ya.L.

Some limiting properties of orthogonal polynomials. Berlin. Akademie Verlag  
1965 no.1:19-20 N '65. (MIRA 18 10)

1. Khar'kovskiy aviatziennyi institut. Submitted April 30, 1965.

GERONIMUS, Ya. L. (Khantsov)

Some imbedding theorems. Izv. vys. ucheb. zav.; mat. no. 6:  
43-62 '65. (MR 19:1)

1. Submitted May 25, 1964.

L 32657-66 EWT(1) IJP(c)

ACC NR: AP6006430

SOURCE CODE: UR/0420/65/000/003/0003/0013

47

AUTHOR: Geronimus, Ya. L. (Professor)

ORG: none

TITLE: Several forms of equations of motion for a material system with nonholonomic nonlinear couplings

SOURCE: Samoletostroyeniye i tekhnika vozdushnogo flota, no. 3, 1965, 3-13

TOPIC TAGS: motion equation, motion mechanics, theoretical mechanics

ABSTRACT: Most literature on analytical and theoretical mechanics considers material systems with holonomic or nonholonomic linear coupling. Only in the derivation of the Gauss minimum principle has it been shown that it holds for nonholonomic, nonlinear coupling. Since this principle is equivalent to the Appel' equations, the question of why the latter hold only for linear nonholonomic coupling remains unresolved. The present paper deals with several forms of equations of motion for systems with nonlinear, nonholonomic coupling. These are obtained by considering the virtual displacement of points (as demonstrated by M. V. Ostrogradskiy, no reference) at fixed configurations and velocities (as is normally done in the derivation of the Gauss principle). For a system with nonholonomic, nonlinear coupling

$$\varphi_s = \varphi_s(t, q_1, \dots, q_n; \dot{q}_1, \dots, \dot{q}_n) = 0, (s = r + 1, \dots, m \leq n),$$

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ACC NR: AP6006430

and a relation between the generalized accelerations of the form

$$\frac{\partial \varphi_s}{\partial q_1} \ddot{q}_1 + \frac{\partial \varphi_s}{\partial q_2} \ddot{q}_2 + \dots + \frac{\partial \varphi_s}{\partial q_n} \ddot{q}_n + (*) = 0, \quad (s = r + 1, \dots, m),$$

the equation of motion is derived as

$$Q_i + S_i + \lambda_1 \frac{\partial \varphi_1}{\partial q_i} + \lambda_2 \frac{\partial \varphi_2}{\partial q_i} + \dots + \lambda_m \frac{\partial \varphi_m}{\partial q_i} = 0, \quad (i = 1, 2, \dots, n),$$

using the method of Lagrange multipliers. Similarly for an acceleration equation of the form

$$\ddot{q}_s = b_{s1} \ddot{q}_1 + b_{s2} \ddot{q}_2 + \dots + b_{s, n-r} \ddot{q}_{n-r} + (*), \quad (s = n-r+1, \dots, n).$$

the equation of motion is derived as

$$\frac{\partial S}{\partial q_i} - \ddot{Q}_i + \mu_1 \frac{\partial \varphi_{r+1}}{\partial q_i} + \mu_2 \frac{\partial \varphi_{r+2}}{\partial q_i} + \dots + \mu_{n-r} \frac{\partial \varphi_n}{\partial q_i}, \quad (i = 1, 2, \dots, n-r).$$

Using a specific example, it is shown that the derived equations give the same results as the Appel' equations. Orig. art. has: 49 formulas.

SUB CODE: 20, 12 SUBM DATE: none/ ORIG REF: 006/ OTH REF: 001

Card 2/2

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GERONIMO, J. C.

A serological analysis of ontogenesis in the bee. V. V. Avrakh and B. S. Heromius. *Bull. Acad. med. sov. t. R. S. S. S. R.* 4, 493 (1937) (in English). Rabbits were immunized with antigens prepd. by mincing 4-day-old and 9-day-old larva, pupa and adult bees in 1:10 physiol. saline, allowing the suspensions to stand in the cold for 24 hrs. and filtering. The antigens were injected i.v. in 0.5-, 0.75- and 1.0-cc. portions at 3-day intervals and the rabbits were bled 6 days after the last injection. The antisera were then set up in cross reactions as follows, with the figures representing the ratio in percentage of the heterologous to the homologous precipitin titer. With the antigens from adult bee, pupa, 9-day-old larva, 4-day-old larva, 2-day-old larva and eggs the rabbit antiserum to adult bees gave ratios of 100, 75, 40, 10, 11 and 0.75, resp., the antiserum to pupa gave ratio of 24.5, 100, 94, 25.5, 9 and 0.75, resp., the antiserum to 9-day-old larva gave ratios of 9, 56, 100, 33, 5 and 0.75, resp., and the antiserum to 4-day-old larva gave ratios of 14, 37, 24, 100, 41 and 0.75, resp.

S. A. Karpala

ADM 504 - METACURICAL LITERATURE CLASSIFICATION

SPROMIRIS, U.S.

"Antigenic Structure of Dysentric Bacteria which Dissolve the Mannite,"

Zhur Mikrobiol., Epidemiol., i Immunobiol., No. 4-5, -1944-.

AVREKH, V.V., GERONIMUS, YE.S.

"Vi and O-Antigens in Typhoid Immunity" two-part article:

- I. "Separation of Vi-Antigen from the Complete Antigens of Typhoid Bacteria," Zhur. Mikrob., Epidemiol. i Immunobiol., no. 1, pp 33-35, 1947.
- II. "Vi- and O-Antigens in Active and Passive Typhoid Immunity," Zhur. Mikrob., Epidemiol. i Immunobiol., no. 1, pp 35-39, 1947

State Control Inst. of Vaccines and Serums im. L.A. Tarasevich

GERONIMUS, Ye. S.

PA 3/49157

USSR/Medicine - Pneumococci  
Medicine - Nucleins

Mar/Apr 48

"Chemical Nature and Biological Specificity of the  
Substance Inducing Transformation of Types of  
Pneumococci," Ye. S. Geronimus, 2 $\frac{1}{2}$  pp

"Uspekhi Sovrem Biol" Vol XXV, No 2

Describes experiments of M. McCarty (Bacter Rev,  
1946). Discusses nature of transforming substance.  
Active agent is specific nucleic acid of desoxyribose  
type.

3/49157

CHRONICLES, Vol. 1.

Influenza

Abstracts of articles on influenza. [1918-1919]. (1919). London, No. 1, 1919.

Monthly List of American Acquisitions, Library of Congress, Jan. 1954. Incl.

GEROVIMUS, Ye.S., zaveduyushchiy otdelem inostrannoy literatury.

Abstracts of articles on epidemiology and research on virus hepatitis.  
Zhur. mikrobiol. epid. i immun. no.2:90-92 F '53. (MLRA 6:5)

1. Zhurnal mikrobiologii, epidemiologii i immunobiologii.  
(Hepatitis, Infectious)

GERONIMUS, Ye.S., zaveduyushchiy otdelom.

Abstract of articles on intestinal infections. Zhur. mikrobiol. epid. i  
immun. no.3:91-95 Mr '53.  
(MLRA 6:6)  
(Intestines--Diseases)

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FD-2335

Card 1/1      Pub 148 - 36/36

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Title      : Foreign publications

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U.S. Library 1965, Vol. 7-6

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Matematicheskoye Proveshcheniye, Matematika, Sov. Prepodavaniye, Prilozheniye, I. Itogi, VT-4 (Mathematical Education, Application and History, Mr. 4) Matematika, Its Teaching, Application and History, Mr. 4) Moscow, Gosizdat, 1959, 15,000 copies printed.

M. I. I. M. Bronshten, Editorial Board of Series: I. M. Bronshten, A. I. Markushevich, I. M. Yaglom, Tech. Ed.: S. M. Aklamov.

PURPOSE: This book is intended for persons without an extensive mathematical education who are interested in trends in contemporary mathematics. The book may be useful to high school mathematics teachers.

COVERAGE: The book consists of articles, reviews, and scientific and methodological reports, some of which are translations from other languages. The book is a collection of modern mathematics, including applications to industry, including mathematics in schools, and mathematics in the development of science in the USSR and abroad. One section deals with scientific and pedagogical literature in USSR and another contains reviews of certain mathematical publications. Some mathematical background is necessary to understand the book; certain articles require a knowledge of higher mathematics.

## Mathematical Education (Cont.)

907/2508

Yaglom, I. M. An Interesting Book on Convex Bodies and Pictures

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EX-12

11-15/2

16.4000 (1031,1132)

26768  
S/103/61/022/006/003/014  
D229/D304

AUTHORS: Vinograd, R.E., and Geronimus, Yu.V. (Moscow)

TITLE: An extrapolation-gradient method of finding the  
minimum of a quadratic function

PERIODICAL: Avtomatika i telemekhanika, v. 22, no. 6, 1961,  
696 - 710

TEXT: The paper investigates the work of an automatic optimizer  
searching for the minimum of the function

$$y(x) = ax^2 + bx + c, \quad a > 0 \quad (1)$$

(a, b, c are unknown constants) in the presence of random error  
at the output of measuring device, i.e. when for a given argument  
x the latter determines

$$Y(x) = y(x) + z \quad (2)$$

instead of  $y(x)$ . If there were no error  $z$ , the minimum abscissa

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An extrapolation-gradient ...

for (1)  $x_{\min} = - b/2a$  could be found by extrapolation from 3 values of  $y(x)$  at arbitrary points  $x_0 - h, x_0, x_0 + h$  (the number  $h$  is called "trial step"). The point  $x_0$  and the "trial step" are to be chosen at random and the transition from  $x_n$  to  $x_{n+1}$  (called "one cycle of search") is made by measuring the values

$$Y_n^- = Y(x_n - h), \quad Y_n = Y(x_n), \quad Y_n^+ = Y(x_n + h),$$

and determining the "working" step  $\Delta_n$ ; then  $x_{n+1} = x_n + \Delta_n$ . A provisional method of determining  $\Delta$  is devised which turns out to be useless since the process is divergent. To avoid divergence one can choose some "protective number"  $k > 0$  and make  $\Delta_n$  depend on relation of  $Y_n^-$  etc. to  $k$ . There are four possible variants; the best one is

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An extrapolation-gradient ...

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$$x_{n+1} = x_n + \frac{h}{2} \frac{y_n^- - y_n^+}{k}, \quad \text{if } y_n^- + y_n^+ - 2y_n < k, \quad (5)$$

$$x_{n+1} = x_n + \frac{h}{2} \frac{y_n^- - y_n^+}{y_n^- + y_n^+ - 2y_n}, \quad \text{if } y_n^- + y_n^+ - 2y_n \geq k.$$

Consisting in a combination of extrapolation method and gradient method which is the one analyzed in the paper. Chance values of the argument  $x_1, x_2 \dots$  obtained by (5) lead to chance values of  $y: y_1, y_2$ ; in addition there are values

$$y_n^\pm = y(x_n \pm h)$$

in every cycle. Optimization should make the quantities  $y_n' = y_n - y_{\min}$ ,  $y_n^\pm = y_n^\pm - y_{\min}$  tend to 0. The quantity

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An extrapolation-gradient ...

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$$u_n = \frac{1}{3} (y_n^{'} - Y_n^{'} + y_n^{''})$$

is chosen as the measure of their common deviation from 0. The problems are: Determination of mathematical expectations  $\bar{u}_n$  and dispersions  $Du_n$ , the limits  $U = \lim \bar{u}_n$  and  $D = \lim Du_n$  ( $n \rightarrow \infty$ ) etc. D is called the established dispersion and U the established error. The results are: The sequences  $\bar{u}_n$  and  $Du_n$  converge as geometrical progressions with respective denominators A and L; A is called the "convergence coefficient". The region of convergence of the process (shaded area on Fig.1) does not contain some values of k near 0, so that one cannot choose the protective number to be arbitrary small, without taking into account the value of h. Simultaneous decrease of convergence coefficient A and established error U is impossible; if h and k are so chosen that  $A \rightarrow 0$ ,  $U \rightarrow \infty$ ; if  $U \rightarrow 0$ ,  $A \rightarrow 1$ . There is an optimum curve in the region of convergence, having the property that one can pass from any

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D229/D304

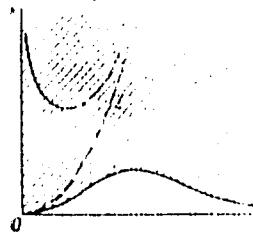
An extrapolation-gradient ...

point of the region to a point on the curve in such a manner that one of the numbers A, U remains constant and the other diminishes. The authors thank A. Fel'dbaum for formulating the problem and discussing the results. There are 6 figures and 2 Soviet-bloc references.

SUBMITTED: February 18, 1961

Fig. 1. Region of convergence and the optimum curve:

Legend: 1 - Optimum curve; 2 -  $k = 2ah^2$ .



$\times$

Рис. 1 Область сходимости и оптимальная кривая: 1 — оптимальная кривая, 2 —  $k = 2ah^2$

Card 5/5

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